National Aeronautics and Space Administration

Automating Airworthiness Assessment for Commercial UAS Fleets

Is it possible to be 100% sure that a drone is fit to fly?

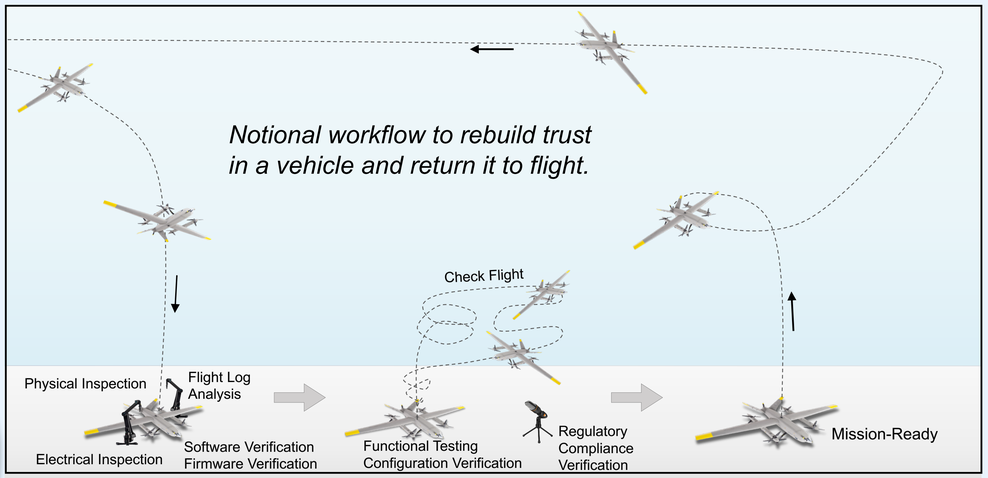
Commercial UAS fleets signify a new paradigm in commercial aviation:

- Vehicle uptime & sortie rates = profit
- Manual inspection by humans does not scale
- Every flight effectively breaks chain of custody
- Vehicles are complex cyber-physical systems
- Data leaks can be more costly than crashes
- Telemetry data cannot be trusted implicitly
- Low part costs mean few, if any, are certified

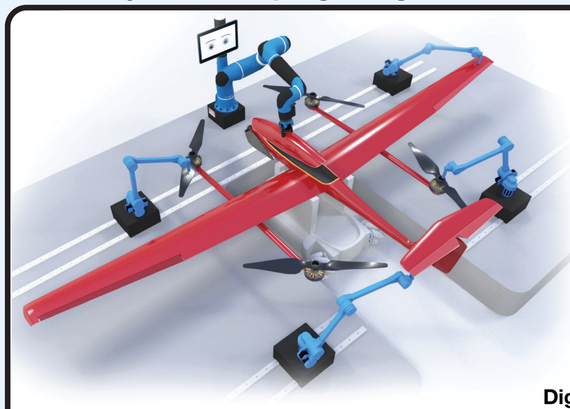
How will airworthiness assessment be done for drones in commercial fleets, when every flight effectively breaks the chain of custody for the aircraft?

Every safety-critical and performance-critical element of the flight system must be verified either directly or independently to rebuild trust and establish the system's airworthiness.

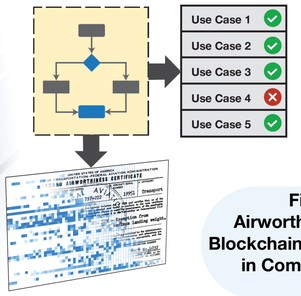
Questions:	Answers:
• Is it made of the correct parts?	• Configuration Control
• Are there missing or extra parts?	• Inspection
• Is everything assembled correctly?	• Component performance verification
• Is everything calibrated correctly?	• Software/Firmware testing & verification
• Is everything configured correctly?	• Fail Safe verification
• Is everything operating correctly?	• Maintenance
• Is anything damaged?	• Subsystem and system testing
• Is anything worn out?	• Independent monitoring of environment
• Has anything been tampered with?	• Independent monitoring of system behavior



Fit2Fly is developing a Digital Airworthiness Certificate to meet these challenges.



Automated Airworthiness Assessment



Digital Airworthiness Certificate

Must Meet the Needs of Operators & Regulators

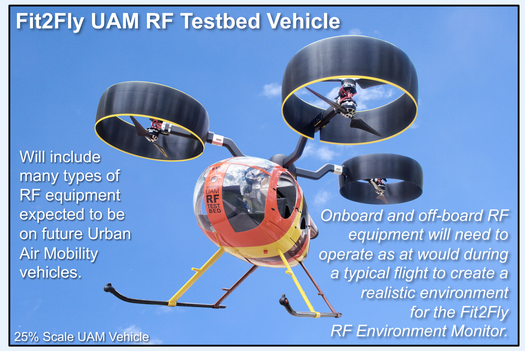
Fit2Fly is developing a modern Digital Airworthiness Certificate on a Permissioned Blockchain, creating tools that all stakeholders in Commercial Aviation can use to establish and manage trust effectively.

BLOCKCHAIN

Fit2Fly is also investigating draft standards for UAS to be considered *"Commercial Grade" and identifying vendors meeting those levels*.

To operate routinely in shared airspace, over people, and over property, commercial UAS fleet vehicles must be designed with the levels of redundancy and reliability already common in other parts of commercial aviation.

Many technologies to address this challenge have been developed and fielded by the automotive industry, where extensive checks of component, subsystem, and system performance are made automatically, onboard the vehicle. These cars self-assess whether they are "roadworthy" every time they are started. The technologies that make this possible are deployed at scale and economical.



Fit2Fly Co-PIs:

Garry D. Qualls garry.d.qualls@nasa.gov

Casey Bakula casey.j.bakula@nasa.gov

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